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Remarks

In view of the above amendments to the claims and the following discussion, the applicants submit that the claims now pending in the application are not obvious under the provisions of 35 U. S. C. § 103. Thus, the applicants believe that all of these claims are in allowable form.

OBJECTIONS

A. Claims

Claim 10 is objected to because the phrase "rod' type" renders the claim unclear. Claim 10 has been amended to delete the phrase "rod' type", therefrom. In view of this amendment to claim 10, the basis for the Examiner's objection thereto has been removed. As such, it is respectfully requested that this objection be withdrawn.

REJECTIONS

A. 35 U. S. C. § 103

1. Claims 10-13 and 15-17 are not obvious over Esaki et al. in view of Lu and Yajima

Claims 10-13 and 15-17 stand rejected under 35 U. S. C. § 103(a) as being unpatentable over Esaki et al. (U. S. Patent 5,716,122 issued February 10, 1998) in view of Lu (U. S. Application Publication 2004/0160578 published August 14, 2004) and Yajima (Japanese Patent Application JP04-267203 published September 22, 1992). Applicants submit that these claims are not rendered obvious by the combination of these references.

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Claims 10-13 and 15-17 are directed to illuminating device comprising a polarization rotator device associated with only one exit face of first and second prisms 1, 2, a light integrating device 7, and a spatial light modulator 8 of a liquid crystal type (see, specification at FIG. 3 and page 8, line 37 to page 9, line 3). The light integrating device has an entry face that is optically coupled to said second exit faces of the prisms and that, receiving the beams reflected by the third faces of the prisms, delivers a beam through an exit face whose illumination is substantially homogeneous over this face and that allows said spatial light modulator to be illuminated in a uniform manner (see, specification at page 9, lines 4-9). The polarizing beam splitter comprises a grid polarizer situated between the first faces of the first and of the second prism (see, specification at page 3, lines 22-25).

In Esaki et al., Fig.1 and excerpts of column 1, line 41 to column 6, line 21 disclose a polarization beam splitter (or PBS) 20x. However, when now going from the polarization beam splitter level to the entire illuminating device level illustrated in FIGS. 2-4 of Esaki et al., one should consider that the optical apparatus of FIGS. 2-4 comprise two optical sources, one being a writing light source 12 emitting a light beam penetrating into a beam splitter 6 (different from the PBS 20x : see below) or 13 (equivalent to the PBS 20x : see below), the other being a reading light source 10 emitting an unpolarized light beam penetrating into the PBS 20x.

In the 2nd embodiment of Esaki et al. starting at column 6, line 22, an unpolarized light beam penetrates "into a beam splitter 6 for amplitude splitting, to be split into two image information pieces in a same intensity and in a same size in a relation of mirror reflection with respect to the amplitude splitting film by the action of the amplitude splitting film 6a (where the amplitude splitting film 6a in the amplitude splitting beam splitter 6 has a function to split the writing light into reflected light and transmitted light at the intensity ratio thereof of approximately 1:1 throughout the entire spectral region (see, Esaki et al. at column 8, lines 19-34). It has to be pointed out that the beam splitter 6 is NOT a

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polarization beam splitter but an amplitude/intensity beam splitter which is different from that of claim 10.

In the 3rd embodiment of Esaki et al. starting at column 8, line 35, "the amplitude splitting beam splitter 6 of the second embodiment is replaced by a PBS (polarization beam splitter) 13 for dual polarization type polarizer-analyzer having the same function as the optical element 20X" ((see, Esaki et al. at column 8, lines 39-40). A transmission type liquid crystal panel 8 ((see, Esaki et al. at column 8, line 46-57) and a liquid crystal optical switch 14 (for rotating the polarization (see, Esaki et al. at column 9, lines 4-36)) are interposed between the writing light source 12 and the PBS 13. Therefore, a polarized light beam penetrates into the PBS, as opposed the invention recited in claim 10 where an unpolarized light beam penetrates the PBS.

In the 4th embodiment of Esaki et al. starting at column 10, line 1, "the transmission type liquid crystal panel 8 and liquid crystal optical switch 14 used in the third embodiment are removed and instead thereof there are provided optical fiber plates 16a, 16b, one end faces of which are mounted to fit the respective regions 40aa, 40bb of writing light receiving surfaces in SLM 40"((see, Esaki et al. at column 10, lines 6-10). Therefore, an unpolarized light beam penetrates into the PBS.

In the Office Action, the Examiner considers that the optical fiber plates 16a, 16b of Esaki et al. (see, Esaki et al. at column 4, line 1 to column 10, lines 21-22) are "a light integrating device". An optical fiber plate cannot be used as a "light integrating device". In Esaki et al. at column 10, lines 20-22, it is stated that each optical fiber plate 16a, 16b transmit "the image information pieces" (provided by the "transmission liquid crystal panels 8a, 8b") onto the SLM 40 for modulation. As there is no chance that a "transmission of "the image information pieces" would provide a "light integrating" function, none of the optical fiber plates 16a, 16b can be considered as "a light integrating device". Moreover, according to Esaki et al. at column 10, lines 28-31, "a necessary point is that the transmission type liquid crystal panels 8a, 8b are uniformly illuminated". As

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these "transmission type liquid crystal panels 8a, 8b" are interposed between the PBS and the optical fiber plates 16a, 16b ((*see*, Esaki et al. at column 4), it means that the uniformity of illumination is not provided by the optical fiber plates 16a, 16b, that are therefore NOT "light integrating devices".

Further, the Examiner's statement that the "light components having the same intensity" quoted in Esaki et al. infers that the PBS 13 of the 4th embodiment "delivers a beam through one exit face whose illumination is substantially homogeneous over this face such as to illuminate said spatial light modulator in a uniform manner". There are two reasons not to interpret this quotation as the Examiner does. In Esaki et al. at column 10, lines 28-31, it is stated that "a necessary point is that the transmission type liquid crystal panels 8a, 8b are uniformly illuminated". This excerpt considers the uniformity of illumination of the liquid crystal panels 8a, 8b, but does not consider the uniformity of illumination of the SLM 40 that the Examiner refers to.

The only excerpt of Esaki et al. that considers "light components having the same intensity" is at column 7, lines 54-58: "Rays of elliptically polarized light emerging from two points on the respective regions 40a, 40b corresponding to the writing light receiving surfaces 40aa, 40bb have respective modulation light components of a same intensity". The aforementioned excerpt concerns only the 2nd embodiment which cannot be considered here as it uses an amplitude/intensity beam splitter instead of a PBS.

As such, Esaki et al. does not describe or suggest an illuminating device including a polarization rotator device associated with only one of said second exit faces of the prisms, so that the integration of light coming from the two exit faces of the prisms is specifically important "to allows the spatial light modulator to be illuminated in a uniform manner", by "mixing" the light coming from one of said second exit faces of the prisms with the light coming from the other of said second exit faces of the prisms, these two lights having the same polarization. Thus, claims 10-13 and 15-17 are patentable over Esaki et al.

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Lu does not describe or suggest an illuminating device including a polarization rotator device is associated with only one of said second exit faces of the prisms, so that the integration of light coming from the two exit faces of the prisms is specifically important "to allows the spatial light modulator to be illuminated in a uniform manner", by "mixing" the light coming from one of said second exit faces of the prisms with the light coming from the other of said second exit faces of the prisms, these two lights having the same polarization. Rather, Lu only describes a grid polarizer between the first faces of two prisms of a polarizing beam splitter.

Yajima does not describe or suggest an illuminating device including a polarization rotator device is associated with only one of said second exit faces of the prisms, so that the integration of light coming from the two exit faces of the prisms is specifically important "to allows the spatial light modulator to be illuminated in a uniform manner", by "mixing" the light coming from one of said second exit faces of the prisms with the light coming from the other of said second exit faces of the prisms, these two lights having the same polarization. Rather, Yajima only discloses a polarization rotator associated with only one of the second exit faces of the prisms.

Further, Esaki et al. teaches throughout that there is no need for a polarization rotator between the prisms and the spatial light modulator. Further, since Yajima only discloses a polarization rotator associated with only one of the second exit faces of the prisms, even if combined with Esaki et al. and Lu, applicants' invention as recited in claims 10-13 and 15-17 is still patentable over these references.

CONCLUSION

Thus, the applicants submit that none of the claims presently in the application are obvious under the provisions of 35 U. S. C. § 103. Consequently, the applicants believe that all of the claims are presently in condition for

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allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring an adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Ms. Patricia A. Verlangieri, at (609) 734-6867, so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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